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September 17, 2019

VIA ECFS

Ms. Marlene H. Dortch
Secretary
Federal Communications Commission
445 12th Street, SW
Washington, DC 20554

Re: Notice of Ex Parte Presentation

GN Docket No. 18-122, *Expanding Flexible Use of the 3.7 to 4.2 GHz Band*

RM-11791, *Petition for Rulemaking to Amend and Modernize Parts 25 and 101 of the Commission's Rule to Authorize and Facilitate the Deployment of Licensed Point-to-Multipoint Fixed Wireless Broadband Service in the 3.7-4.2 GHz Band*

RM-11778, *Fixed Wireless Communications Coalition, Inc., Request for Modified Coordination Procedures in Band Shared Between the Fixed Service and the Fixed Satellite Service*

Dear Ms. Dortch:

Charter Communications, Inc. ("Charter") writes in response to the C-Band Alliance's ("CBA" or "Alliance") proposed Flexible Use and Efficient Licensing ("FUEL") auction plan.[1] As explained in detail below, the FUEL design would enrich the Alliance's members at the expense of the American taxpayer and favors the interests of large wireless providers over smaller providers and new entrants. Far from offering a simple auction mechanism, the Alliance proposes a novel and complex bidding approach that will discourage wide participation. There is no justification for substituting this untested and overly complicated auction design in lieu of the well-established procedures that the Commission has developed over the past decades. The Commission should reject this plan for allocating and assigning critical spectrum assets, in order to ensure that these assets are deployed in the public interest.

Background

The future of the 3.7-4.2 GHz spectrum band (the "C-Band") has significant implications in the global race to 5G. Reallocating the maximum amount of C-Band spectrum from satellite

[1] *See* Letter from Bill Tolpegin, Chief Executive Officer, C-Band Alliance, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (June 12, 2019) ("*CBA Auction Letter*") (attaching [Auction]omics *WHITE PAPER—FUEL for 5G: Flexible Use and Efficient Licensing* (June 12, 2019) ("*CBA Auction Whitepaper*")).

services to terrestrial 5G providers will best position the United States to deploy 5G and the new services and applications it enables, and to ensure a competitive marketplace for these new services and applications. To achieve this goal, however, the Commission must adopt a process that makes this important public resource available for public use in the fairest and most efficient manner possible. As Charter has previously explained, we believe the best way to do so is for the Commission to exercise its well-established statutory authority to clear the maximum possible amount of the C-Band for terrestrial use by transitioning incumbent users to fiber-based distribution systems and awarding the resulting terrestrial licenses through a system of competitive bidding that satisfies the requirements of the Communications Act ("Act").[2]

As numerous other parties have noted, the FUEL proposal represents a dramatic departure from roughly a quarter-century of Commission precedent regarding spectrum auctions.[3] The CBA's proposal would enable its members to garner a massive windfall by selling 180 megahertz of C-Band spectrum as quickly as possible to the largest national wireless carriers at prices effectively set by the CBA rather than a competitive market. While other countries have tried the Vickrey-nearest core pricing rule for allocating spectrum licenses, most have since moved away from this type of pricing.[4]

The CBA's proposed truncated auction system, with its lack of opportunity for full price discovery via open bidding by all participants, serves the financial goals of the CBA members, their management teams, and their investors, but does not serve the public interest. Charter strongly agrees that licenses for the terrestrial use of C-Band spectrum should be awarded through an auction, but the auction should be designed and conducted by the Commission to ensure fairness, transparency, and efficiency in the sale of this important asset.

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[2] *See* Letter from Elizabeth Andrion, Senior Vice President, Regulatory Affairs, Charter Communications, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (Feb. 22, 2019); *see also* Letter from Ross Lieberman, Senior Vice President, Government Affairs, ACA Connects – America's Communications Association, Elizabeth Andrion, Senior Vice President, Regulatory Affairs, Charter Communications, Inc., and Alexi Maltas, Senior Vice President & General Counsel, Competitive Carriers Association, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 (July 2, 2019).

[3] *See, e.g.*, Letter from Steve B. Sharkey, Vice President, Government Affairs, Technology, and Engineering Policy, T-Mobile USA, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 4 (July 12, 2019) ("*T-Mobile Auction Letter*"); Letter from Michael P. Goggin, AT&T, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 2 (July 16, 2019) ("*AT&T Auction Letter*"); Letter from Edward D. Moise, Jr., Principal, Moise Advisory, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 5 (July 1, 2019) ("*Moise Auction Letter*"); Comments of Dynamic Spectrum Alliance at 4-5, GN Docket No. 18-122 (July 3, 2019) ("DSA Comments").

[4] *See AT&T Auction Letter* at 5. While the FCC used a second-price core-selecting auction in the assignment round of the broadcast incentive auction, the Commission has never used such an approach to allocate spectrum.

The FUEL Auction Plan Will Not Serve the Public Interest

Although the CBA touts the FUEL auction as an innovative solution through which the C-Band can be quickly and efficiently repurposed, in fact the FUEL auction would subject market participants to a system whose design appears primarily intended to confer an unwarranted financial windfall to the CBA at the expense of American taxpayers, new market entrants, and small and rural carriers. FUEL will serve the short-term interests of Alliance members, not the long-term public interest.

Financial Windfall for the CBA. As an initial matter, the FUEL auction would result in a financial windfall for the foreign-owned satellite companies that comprise the CBA, who would pocket huge sums of money as the sole beneficiaries of their own privately administered auction.[5] Indeed, the market itself has recognized that the CBA's underlying proposal for reallocating C-Band spectrum will result in a dramatic upturn in the CBA members' financial fortunes.[6]

Allows the CBA to Set the Sale Price. The FUEL auction will use reserve prices to set minimum winning bids,[7] but the auction plan will also utilize a "second price" rule (which FUEL implements using an opaque "Vickrey-nearest core-selecting" algorithm[8]) to establish the amount that a winning bidder actually pays. The FUEL proposal does not provide the supporting information for determining either the reserve bids or the winning bids.[9] Since the opening price can also act as the second price,[10] the proposal essentially allows the CBA to set the opening sale price for the reallocated C-Band spectrum at a level that is largely beyond the financial capabilities of all but the largest bidders. Rather than letting the market determine the appropriate value of a license, the CBA will determine the price. According to the FUEL proposal, the aggregate reserve bid amounts could be as high as $24 billion.[11] As described below, the non-transparent nature of this private auction is exacerbated by the proposed use of sealed bids, package bidding, and only two bidding rounds.

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[5] *See* DSA Comments at 5.

[6] For example, Intelsat's stock price rose by more than 17 percent in July 2018 after the Commission adopted its 3.7-4.2 GHz Band Notice of Proposed Rulemaking in anticipation that the CBA's plan would be adopted. *See* Keith Noonan, *Why Intelsat S.A. Stock Gained 17% in July*, Nasdaq (Aug. 8, 2018), https://www.nasdaq.com/article/why-intelsat-sa-stock-gained-17-in-july-cm1004452.

[7] *See CBA Auction Whitepaper* at 11.

[8] *See id.* at 12.

[9] *See id.* at 10-11.

[10] *See id.* at 11.

[11] *See id.* (indicating aggregate reserve bid could be set "based on international $/MHz pop benchmarks"). Similar spectrum has been valued as high as $0.42/MHz pop. *See* Letter from Colby May, Counsel for Trinity Broadcasting Network, and Ravi Potharlanka, LPN Spectrum, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 18-122 at 5 (May 16, 2019). Assuming the auction were limited to the lower 48 states, the aggregate reserve price would exceed $24 billion for 180 megahertz.

There are also other inequities caused by the "second price" rule. For instance, because the price paid by the winning bidder does not depend entirely on the prices that the bidder offered but does depend directly on prices *other* bidders offer, bidders can, and, at times, will want to submit bids that are certain to lose with the sole purpose of increasing prices rivals pay.[12] The "second price" rule therefore allows bidders to engage in anticompetitive behavior by driving up the cost of the spectrum as a means to prevent other entities from winning the spectrum at auction (or at least from winning that spectrum at a reasonable cost).[13] The Vickrey-nearest core pricing rule is also often profoundly unfair, potentially allowing one bidder to win a greater amount of spectrum than a rival while paying less for the privilege. Indeed, this has been the result in previous auctions that used the same pricing rule.[14]

Favoring Large Bidders with "Package Bidding." While "package bidding" tends to favor large bidders, the novel form of package bidding system embraced by the CBA is particularly beneficial to established national wireless carriers and harmful to new entrants, as well as small or rural carriers who likely would bid on individual licenses or smaller packages involving only a small number of individual licenses.[15] The CBA's emphasis on using package bidding to avoid the so-called "exposure problem,"[16] along with use of Partial Economic Areas ("PEAs"), is telling as to the CBA's priorities, since that problem generally affects only large players who are interested in building out national or large regional networks.

Just as tellingly, the CBA fails to address the "threshold problem" that arises when smaller bidders value a license at an amount higher than larger bidders who are seeking multiple licenses, but are unable to pay the package bid price. The other auction designs traditionally

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[12] *See CBA Auction Whitepaper* at 11. *See also* National Audit Office, 4G radio spectrum auction: lessons learned 6 (2014), https://www.nao.org.uk/wp-content/uploads/2015/03/4G-radio-spectrum-auction-lessons-learned.pdf ("During the first stage of bidding, the auction rules allowed bidders to make bids knowing these were unlikely to be winning bids, helping to disguise their real intentions. Our analysis indicates both EE and Three did this during the first round of bidding"). A similar result occurred in the auction in Austria for 800, 900 and 1800 MHz licenses. *See* Press Release, RTR, Result of the 2013 Mulitband Auction Driven by Consistently Offensive Bidding Strategy on the Part of All Three Contenders (Oct. 28, 2013), https://www.rtr.at/en/pr/PI28102013TK.

[13] *See* Jonathan Levin & Andrzej Skrzypacz, *Properties of the Combinatorial Clock Auction*, 106 Am. Econ. Rev. 2528, 2540-44, 2549 (2016) (demonstrating that a Vickrey auction "provides bidders with the opportunity to raise rival prices with little or no risk to their own payoff").

[14] For example, in the Swiss auctions for the 800 MHz, 900 MHz, 1.8 GHz, 2.1 GHz and 2.6 GHz bands, which utilized the Vickrey-nearest core selecting pricing rule, Swisscom won approximately a third more spectrum than bidder Sunrise, but paid approximately a third less. Even considering just the results of the auction for the sub-2.6 GHz bands, which had higher values at the time, Swisscom still won more spectrum and paid less. Similarly, in the Netherlands 4G and multi-band auction of 2012, mobile operator KPN won 25 megahertz or 27% more than Vodafone in the 2.6 GHz band despite paying €31 million (~USD 40 million) or 2.3% less. *See* David Salant, A Primer on Auction Design, Management, and Strategy 142, 149 (2014) ("Salant Auction Analysis").

[15] *See Moise Auction Letter* at 2-4; DSA Comments at 8-9.

[16] *See CBA Auction Whitepaper* at 15-16.

used by the Commission without package bidding—standard simultaneous multiple-round auctions and clock auctions—better protect the interests of smaller bidders, who may be interested in pursuing a more targeted bidding strategy for various individual licenses.[17]

Overly Complex. Although the CBA touts the simplicity of the FUEL auction as one of its prime virtues, in reality the auction is not simple at all. While the FUEL proposal attempts to sidestep the complexity of package bidding by relying on "base packages" with increments and decrements,[18] the fact remains that the potential number of additions to and subtractions from a base package would yield a dizzying array of potential packages that would create daunting complexity for most bidders.[19] The complexity of package bidding, combined with the lack of price discovery in a truncated sealed-bid auction, would create strategic problems that are not present in more well-known designs, such as a clock auction, that present less complexity and more transparency.[20]

Additionally, many of the purported speed advantages of the CBA's FUEL auction are red herrings. For example, the CBA's suggestion that multi-round auctions are problematic because they require substantial strategic preparation[21] ignores the fact that one of the most time-consuming parts of the preparation process is modeling the value of the licenses. This type of modeling would still be necessary even in the single-round sealed-bid auction proposed by the CBA.

The CBA also ignores the fact that, even if the auction itself is relatively swift, the time and effort necessary to develop and analyze potential bids would likely prove prohibitive for all but the most sophisticated market players. In order to prepare for the auction, bidders would be required to spend huge amounts of time educating themselves about the bidding system, developing evaluation metrics, and creating audit and transparency protocols.[22] If, for example, a bidder was interested in a nationwide set of block quantities, or alternative groups of licenses, it would be required to evaluate thousands of potential valuations as it considered the marginal cost of adding or subtracting individual blocks in its preferred range. Simply analyzing all of the potential bids could take months, and even then the bids submitted might contain errors that would call the results of the auction into question.[23]

The sealed-bid nature of the FUEL auction also presents preparation challenges. In a clock auction, bidders can refine valuations as needed as prices rise. In the FUEL auction, all

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[17] *See Moise Auction Letter* at 4-5; *T-Mobile Auction Letter* at 5.

[18] *See CBA Auction Whitepaper* at 8.

[19] *See, e.g.*, *T-Mobile Auction Letter* at 4.

[20] *See, e.g.*, *id.* at 4 & n.13.

[21] *See CBA Auction Whitepaper* at 16.

[22] *See AT&T Auction Letter* at 3-4.

[23] *See id.* at 4.

package values, including most that will turn out to be irrelevant, need to be more carefully evaluated in advance of bidding. The complexity and opacity of the FUEL auction plan has raised concerns among market participants that its intent is mainly to cement the CBA's control over the auction process in order to maximize the proceeds for its members,[24] rather than to ensure the fair and efficient repurposing of the C-Band in accordance with the public interest.

Significantly, these extremely complicated bidding rules would also enable a handful of large industry players to dominate the auction. In addition to having the deepest pockets of all potential bidders, these carriers also have the type of institutional, repeat-player expertise that will allow them to win spectrum that might otherwise be assigned to smaller entities lacking the technological know-how to manipulate the FUEL auction's complex system design.[25] Thus, the ultimate consequence of this FUEL mechanism will be to present challenges for smaller bidders who value more targeted amounts of spectrum, effectively allowing the CBA to limit opportunities for purchasing the spectrum to dominant industry players.[26]

Facilitate Coordination and Collusion. The FUEL auction also would facilitate coordination and collusion, and in a way most harmful to all but the largest bidders. In Commission-run auctions, communications between bidders are prohibited in an effort to prevent collusive behavior. By contrast, the FUEL auction design would allow, and even encourage, tacit collusion among bidders. For example, the proposed "[c]oordination" round of bids—an optional system through which firms may submit bids at prices derived from prices paid for similar spectrum in previous auctions[27]—would permit larger market players to signal to one another where to bid for four blocks and where to bid for five. Conversely, smaller bidders that participate in the coordination round risk inadvertently revealing their identity and their target markets, which could disincentivize their participation in this round. To the extent smaller bidders do participate in the coordination round, larger bidders could exploit this information in the second round by strategically bidding up the price for those markets and dictating the price that these smaller bidders would have to pay.[28]

Moreover, the so-called simplified form of package bidding permitted by the FUEL auction would facilitate coordination among the largest nationwide bidders. The FUEL proposal defines "small" (limited to PEAs within a single Economic Area ("EA")) and "large" (not limited to a single EA) bid groups and package bids.[29] A bidder will only be able to bid on a limited number of large bid groups and can only win one bid for a large package bid.[30] These

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[24] *See Moise Auction Letter* at 2-4; *T-Mobile Auction Letter* at 5-6.

[25] *See T-Mobile Auction Letter* at 5.

[26] *See Moise Auction Letter* at 4-5.

[27] *See CBA Auction Whitepaper* at 6.

[28] *See Moise Auction Letter* at 2-3; *T-Mobile Auction Letter* at 5.

[29] *See CBA Auction Whitepaper* at 10.

[30] *See id.*

limitations will provide an opportunity and incentive for the large national carriers most likely to be interested in large groups to coordinate their bidding activity in order to obtain the largest bid groups possible, likely to the detriment of non-nationwide bidders who would prefer to win smaller packages.

Lack of Clarity and Development. The development of an auction design behind closed doors—and in a way that will maximize the CBA's own profits at the expense of the American public—has resulted in an auction proposal that is arbitrary, undeveloped, and under-explained.

For instance, the FUEL auction design assumes that it is desirable to clear spectrum by auctioning blocks covering 406 PEAs. But the CBA has never explained why it would be most efficient to use PEAs as opposed to some other geographical unit, such as counties. The CBA's proposal to use PEAs will only benefit the nation's largest wireless carriers and will do nothing to make the C-Band auction more accessible to new market entrants, as well as small or rural carriers.[31]

Relatedly, the CBA's auction proposal also assumes the desirability of package bidding, even though it is not clear what goal or objective package bidding is meant to achieve other than to give large nationwide bidders an unwarranted advantage in the auction. Nationwide carriers have seemed to manage the exposure problem in many previous auctions without package bidding. The auction design also reflects the CBA's proposal to clear the C-Band in tranches, even though this approach would add significant complexity to the auction and favor larger bidders by constraining the immediate availability of spectrum. Finally, the FUEL auction design appears to assume that all of the available blocks are equivalent, but until the band plan is released and interference standards and other technical matters are resolved, it is impossible to know whether the blocks can be considered truly generic.[32]

Even with respect to the FUEL auction design itself, the CBA does not provide details that are critical to understanding how the auction will be operationalized and whether it will truly be fair. For example, the CBA's proposal is silent on the question of how reserve bids and bids

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[31] The Commission itself recently rejected the use of PEAs for the auction of PAL licenses in the 3.5 GHz band, in part because of competitive concerns. *See In re Promoting Investment in the 3550-3700 MHz Band*, Report and Order, 33 FCC Rcd 10598, 10620 ¶ 39 (2018) (rejecting proposal to adopt PEAs nationwide for CBRS, noting "agree[ment] with those commenters that cite the potential negative effects of adopting license areas as large as PEAs").

[32] For instance, in adopting the procedures for the broadcast incentive forward auction, the Commission created two categories of generic blocks reflecting the extent to which the blocks may be impaired by broadcast television stations repacked in the 600 MHz Band. *See Broadcast Incentive Auction Scheduled to Begin on March 29, 2016 Procedures for Competitive Bidding in Auction 1000, Including Clearing Initial Target Determination, Qualifying to Bid, and Bidding in Auctions 1001 (Reverse) and 1002 (Forward)*, Public Notice, 30 FCC Rcd 8975, 9047-51 ¶¶ 143-148 (2015). In the final stage of the actual forward auction, only one category of blocks was offered because no stations needed to be repacked in the wireless band. *See Clearing Target of 84 Megahertz Set for Stage 4 of the Broadband Television Spectrum Incentive Auction; Stage 4 Bidding in the Reverse Auction Will Start on December 13, 2016*, Public Notice, 31 FCC Rcd 12846, 12847 ¶ 4 (2016).

submitted in the two allocation rounds will be combined to determine winning bids. Moreover, the CBA's proposal does not disclose details concerning its data and distribution methods or the mathematical formulas that will be used in the pre-auction bidder trainings. Critically, the lack of clarification on these important points prevents any nuanced analysis of how the auction will work in practice.

While it is commendable that the CBA has now admitted that it will need to use an auction, rather than a privately negotiated secondary sale, as it initially suggested, the public interest would still be best served by a Commission-led auction that will be administered fairly and openly, rather than an unprecedented private auction of public spectrum.

Lack of Efficiency. Finally, the CBA's claims concerning the purported efficiency and fairness of its proposed system[33] are vastly overstated if not outright incorrect. As noted above, for instance, second-price auctions do not always give bidders an incentive to report true values. The proposed restrictions on the number and type of packages are also likely to deter bidders from expressing what they believe to be true values, even if they were otherwise inclined to do so. Finally the outcome of the FUEL auction will likely be inefficient because the complexity and inherent randomness in auctions using Vickrey pricing or Vickrey-nearest core-selecting pricing[34] creates a strong incentive for bidders to leave potentially a large fraction of their budgets unspent to avoid the elevated risk of exceeding their budget constraints that is created by this complexity.[35]

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[33] *See CBA Auction Whitepaper* at 13-14.

[34] *See, e.g.*, Lawrence M. Ausubel & Paul Milgrom, *The Lovely but Lonely Vickrey Auction*, Combinatorial Auctions 17, 22-26 (2006) (illustrating the difficult nature of the decision problems presented by Vickrey auctions). These problems also arise in Vickrey-nearest core-selecting pricing auctions. For instance, a combinatorial clock auction ("CCA"), which uses Vickrey-nearest core pricing, and the Vickrey auction can both have random, *i.e.*, mixed strategy, equilibrium when bidders face binding budget constraints. *See* Salant Auction Analysis at 149-50. This is also true for the FUEL auction given that the allowed bids and payoffs are the same as in a CCA. Further, Vickrey-nearest core-selecting prices only adjust Vickrey prices to extent that the nearest core-selecting prices ensure that the total prices paid for the licenses are not lower than what the losing bidders would have paid.

[35] Even with the use of core selection, bidders who are financially constrained still need to decide how to allocate budgets across multiple blocks. Under Vickrey-nearest core pricing, as under any Vickrey auction, the amount a bidder pays will typically be less than the full bid amount. Anticipating this situation, a bidder can choose to bid for more blocks than it can afford if it had to pay its full bid amount or only bidding up to its budget and accept winning fewer licenses. In the latter case, which will apply when a bidder faces severe budget constraints, such as debt covenants, licenses may be misallocated, or even unsold, and money will be left unspent. The fact the budget constraints create decision problems for bidders in Vickrey auctions, including core-selecting auctions, is well documented in the literature. *See* Balázs Szentes & Robert W. Rosenthal, *Three-Object Two-Bidder Simultaneous Auctions: Chopsticks and Tetrahedra*, 44 Games & Econ. Behav. 114, 114-133 (2003); Yeon-Koo Che & Ian Gale, Standard Auctions with Financially Constrained Bidders, 65 The Rev. of Econ. Stud. 1, 1-21 (1998).

The CBA's FUEL auction proposal reflects and advances the goals of the CBA, at the expense of the public interest and competition. Only a Commission-led auction can provide public confidence that the critical C-Band reallocation process is conducted in a manner that is fair and open. A Commission-led auction also provides the best and most effective path towards the expeditious and nationwide deployment of 5G. The Commission should ensure that the C-Band is reallocated under a framework that meets these important goals.

Respectfully submitted,

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